

Unit 15

Day 6

Descartes' Rule of signs:

Let $f(x)$ be a polynomial with real coefficients and terms in descending degree order:

a) the number of positive real zeros of $f(x)$ either is equal to the number of variations in signs occurring in the coefficients of $f(x)$, or else is less than the number of variations decreased by a positive even integer.

b) the number of negative real zeros of $f(x)$ either is equal to the number of variations in signs occurring in the coefficients of $f(-x)$, or else is less than the number of variations decreased by a positive even integer.

Note - Polynomial must be written in descending degree and missing terms are not counted as a change in signs!

Ex1: $f(x) = x^4 - 3x^3 + 2x + 7$

of positive real zeros 2, 0

of negative real zeros 2, 0

of complex zeros 0, 2, 4

Ex2: $f(x) = 2x^3 + 6x^2 + 5x - 2$

of positive real zeros 1

of negative real zeros 2, 0

of complex zeros 0, 2

$$\begin{aligned} f(-x) &= (-x)^4 - 3(-x)^3 + 2(-x) + 7 \\ &= x^4 + 3x^3 - 2x + 7 \end{aligned}$$

$$f(x) = - + - -$$

Wksht 1-8 all & pg 301 67-72 all